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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/960,748	09/24/2001	Tetsuya Katagiri	48864-042	5033

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EXAMINER	
KIM, CHONG R	

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 08/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/960,748	Applicant(s) KATAGIRI ET AL.	
	Examiner Charles Kim	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 24 September 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

The following quotation of 37 CFR § 1.75(a) is the basis of objection:

> (a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

1. Claims 5, 8 are objected to under 37 CFR § 1.75 (a) and (d)(1) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery.

Referring to claim 5, the phrase "the base member is the support board and the movable member is the turn table" in lines 2-3 lacks antecedent basis. It appears that the applicant intended the phrase to read "the base member is a support board and the movable member is a turn table". Appropriate correction is required.

Referring to claim 8, the phrase "the plural second elements" in line 3 lacks antecedent basis. It appears that the applicant intended the phrase to read "plural second elements". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Referring to claim 18, the phrase "angle of one of the measurement device and the object with respect to **another one of the measurement device** and the object" in lines 8-10 renders the claim indefinite because it is unclear whether there is a single measurement device taking measurements at different positions or postures (lines 4-6) or whether there are multiple measurement devices taking measurements. For examination purposes, the phrase will be interpreted as "angle of one of the measurement device and the object with respect to one another", as disclosed on pages 10-11 of the applicant's specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 10-15, 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Ritter et al., U.S. Patent No. 6,363,169 ("Ritter").

Referring to claim 10, Ritter discloses a three-dimensional data generating system comprising:

a. a measurement portion (2) for generating three-dimensional data by measuring a three-dimensional shape of an object without contacting the object (col. 9, lines 31-38)

b. a sensor for measuring a relative position and a relative posture between a first member (5R, 5G, 5B, 5Y) and the measurement portion, the first member whose position and posture being kept constant with respect to the object during plural times of measurements by the measurement portion and a second member being capable of detecting a relative position or a relative posture with respect to the first member (col. 9, lines 39-55, col. 11, lines 16-52, and figure 10)

c. a data integrating portion for integrating plural sets of three-dimensional data generated by the plural times of measurements based on each of the relative positions and the relative postures measured by the sensor at each of the measurements (col. 9, line 56-col. 10, line 36).

Referring to claim 11, Ritter further discloses that the measurement portion includes a three-dimensional measurement device for generating the three-dimensional data of the object by a light section method (col. 9, lines 31-38).

Referring to claim 12, Ritter further discloses that the three-dimensional measurement device is movable to an arbitrary position and an arbitrary posture during the plural times of measurements (col. 9, lines 31-38).

Referring to claim 13, Ritter further discloses a digital camera (2) for photographing a two-dimensional image of the object (col. 9, lines 31-41), and a three

dimensional data generating portion for generating the three-dimensional data of the object based on the plural two-dimensional images of the object photographed by the digital camera (col. 9, line 56-col. 10, line 36).

Referring to claim 14, Ritter further discloses that the digital camera is movable to an arbitrary position and an arbitrary posture during the plural times of measurements (col. 9, lines 32-41).

Referring to claim 15, Ritter discloses a three dimensional data generating system comprising:

a. a measurement device for generating three-dimensional data by measuring a three-dimensional shape of an object from an arbitrary position at an arbitrary posture (col. 9, lines 31-38)

b. a sensor for measuring a position and a posture of the measurement device at each of the measurements (col. 9, lines 39-55 and col. 11, lines 16-52)

c. a data integrating portion for integrating the three-dimensional data of the object generated by the plural times of measurements at different positions and postures (col. 9, line 56-col. 10, line 36).

Referring to claim 18 as best understood, Ritter discloses a method for generating a set of three-dimensional data by integrating plural sets of three-dimensional data, the method comprising the steps of:

a. generating the plural sets of three-dimensional data by plural times of measurements of an object at different positions or postures using a measurement device (col. 9, lines 31-38)

b. calculating a three-dimensional coordinate and an Eulerian angle of one of the measurement device and the object with respect to one another by measuring a relative position and a relative posture between the measurement device and the object at each of the measurements (col. 9, lines 39-55 and col. 11, lines 16-62)

c. generating a set of three-dimensional data by integrating the plural sets of three-dimensional data using the three-dimensional coordinate and the Eulerian angle that have been calculated (col. 12, lines 10-14).

Referring to claim 19, Ritter further discloses that the frames including the generated three-dimensional data are generated and memorized in accordance with generation of the three-dimensional data (col. 5, 31-66 and col. 10, lines 46-58), and the three dimensional coordinate and the Eulerian angle calculated at each of the measurements are memorized as a part of each of the frames (col. 11, lines 15-52).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Matsumoto et al., U.S. Patent No. 6,356,272 ("Matsumoto") and Klein et al., U.S. Patent No. 6,228,028 ("Klein").

Referring to claim 1, Matsumoto discloses a three-dimensional data generating system comprising:

a. a measurement portion (120) for generating three-dimensional data by measuring a three-dimensional shape of an object (col. 39, lines 27-62)

b. a position and posture changing portion (110) for changing a position or a posture of the object (col. 39, lines 28-38)

c. a position and posture sensing portion for measuring a relative position and a relative posture between the measurement portion and the position and posture changing portion (col. 40, lines 35-63 and col. 41, lines 1-4)

d. a data integrating portion for integrating plural sets of three-dimensional data generated by plural times of measurements in the measurement portion based on each of the relative positions and the relative postures measured by the position and posture sensing portion at each of the measurements (col. 42, lines 8-56).

Matsumoto does not explicitly disclose that the position and posture sensing portion includes a first element provided in the measurement portion and a second element provided in the position and posture changing portion. However, these features were exceedingly well known in the art. For example, Klein discloses a position and posture sensing portion that includes a first element provided in a measurement portion and a second element provided on an object, for measuring the relative position and a relative posture between the first and second element (col. 6, lines 19-43).

Matsumoto and Klein are combinable because they are both concerned with three-dimensional imaging systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the position and posture sensing portion

of Matsumoto so that it includes the features taught by Klein. Note that object that is imaged in Matsumoto's system is located on the position and posturing changing portion (col. 39, lines 28-29). In this case, the combination of Matsumoto and Klein teaches that the second element of Klein is provided on the object of Matsumoto, wherein the object of Matsumoto is located on the position and posture changing portion. In other words, the combination teaches that the second element is provided in the position and posture changing portion. The suggestion/motivation for the combination would have been to provide an accurate reconstruction of the three-dimensional model image of the object. Therefore, it would have been obvious to combine Matsumoto with Klein to obtain the invention as specified in claim 1.

Referring to claim 2, Matsumoto further discloses that the position and posture changing portion includes a movable member whose position and posture are kept constant with respect to the object during the plural times of measurements (col. 39, lines 28-47).

Matsumoto and Klein do not explicitly disclose that the second element is provided in the movable member. However, the combination teaches that the second element is provided in the position and posture changing portion, as noted above. Furthermore, Matsumoto is concerned with determining the positional relationship between the camera and each of the images obtained during the plural times of measurements (col. 42, lines 3-23). Therefore, the Examiner notes that it would have been obvious to provide the second element in the movable member. The suggestion/motivation for doing so would have been to determine the positional relationship between the camera and each of the images so that the positional relationship

between each of the object images obtained during the plural times of measurements and a common coordinate system voxel space can be determined for a proper three-dimensional reconstruction of the object (Matsumoto, col. 42, lines 3-23).

Referring to claim 3, Matsumoto further discloses that the position and posture changing portion further includes a support board for changing the position and the posture of the movable member, and the movable member is a turn table rotationally driven by the support board (col. 39, lines 28-47 and figure 4).

Referring to claim 4, Matsumoto further discloses that the position and posture changing portion includes:

i. a movable member whose position and posture are kept constant with respect to the object during the plural times of measurements (figure 4),

ii. a base member for changing the position and the posture of the movable member (figure 4)

iii. a detecting portion for detecting an amount of change of the position and the posture of the movable member with respect to the base member (col. 39, lines 27-38).

Matsumoto and Klein do not explicitly disclose that the second element is provided in the base member. However, the combination teaches that the second element is provided in the position and posture changing portion, as noted above. Furthermore, Matsumoto is concerned with determining the positional relationship between the camera and the base member (col. 42, lines 3-23). Therefore, the Examiner notes that it would have been obvious to provide the second element in the base member. The suggestion/motivation for doing so would have been to determine the positional

relationship between the camera and the base member, so that the positional relationship between each of the object images obtained during the plural times of measurements and a common coordinate system voxel space can be determined for a proper three-dimensional reconstruction of the object (Matsumoto, col. 42, lines 3-23).

Referring to claim 5, Matsumoto further discloses that the base member is a support board and the movable member is a turn table rotationally driven by the support board (col. 39, lines 27-38 and figure 4), and the detecting portion includes an encoder for encoding the rotational angle of the turn table to the support board (col. 39, lines 37-39).

Referring to claim 6, Klein further discloses that the first element measures the position and the posture of the second element with respect to the first element (col. 6, lines 19-37).

Referring to claim 7, Klein further discloses that the second element measures the position and the posture of the first element with respect to the second element (col. 6, lines 19-37).

Referring to claim 9, Klein further discloses that the position and posture sensing portion measures the relative position and the relative posture between the first element and the second element by electromagnetic induction (col. 6, lines 19-37).

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Matsumoto et al., U.S. Patent No. 6,356,272 ("Matsumoto") and Klein et al., U.S. Patent No. 6,228,028 ("Klein"), further in view of Murata, Japanese Patent No. 10-332347 ("Murata").

Referring to claim 8, Matsumoto and Klein do not explicitly disclose plural second elements that are provided in the position and posture changing portion. However, this feature was exceedingly well known in the art. For example, Murata discloses plural elements (A, B, C, D) that are provided in a position and posture changing portion (figure 1).

Matsumoto, Klein, and Murata are combinable because they are all concerned with three-dimensional imaging systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the position and posture changing portion of Matsumoto and Klein so that it includes the plural elements of Murata. The suggestion/motivation for doing so would have been provide additional position/posture information, so that the positional relationship between each of the object images obtained during the plural times of measurements and a common coordinate system voxel space can be determined for a proper three-dimensional reconstruction of the object (Matsumoto, col. 42, lines 3-23). Therefore, it would have been obvious to combine Matsumoto and Klein with Murata to obtain the invention as specified in claim 8.

6. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Ritter et al., U.S. Patent No. 6,363,169 ("Ritter") and Rhoads, U.S. Patent No. 6,411,725 ("Rhoads").

Referring to claim 16, Ritter does not explicitly disclose that the sensor includes a transmitter and receivers and measures the position and the posture of the measurement device with respect to the object based on a relative position and a relative posture

between the transmitter and each of the receivers. However, transmitters and receivers were exceedingly well known for determining a position and a posture of a measurement device with respect to an object. For example, Rhoads discloses a sensor that includes a transmitter and receivers for measuring the position and the posture of a measurement device with respect to an object based on a relative position and a relative posture between the transmitter and each of the receivers (col. 8, lines 36-51).

Ritter and Rhoads are combinable because they are both concerned with imaging systems that determine the spatial relationship between an imaging device and an object. Ritter explains that any method can be used to determine the position and posture of the measurement device with respect to the object (col. 9, lines 50-55). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the sensor of Ritter so that it includes the transmitter and receivers of Rhoads. The suggestion/motivation for doing so would have been to accurately determine the spatial relationship between the camera and the object, thereby providing a proper three-dimensional reconstruction of the object. Therefore, it would have been obvious to combine Ritter with Rhoads to obtain the invention as specified in claim 16.

Referring to claim 17, Rhoads explains that the transmitters are provided at an object side and a measurement device side and the receiver is provided away from the object as well as the measurement device. However, Ritter and Rhoads do not explicitly disclose that the receivers are provided at an object side and a measurement device side and the transmitter is provided away from the object as well as the measurement device. The Examiner notes that the specific configuration of the transmitters/receivers is not considered a patentable distinction for the following reasons. Rhoads explains that the

receivers and transmitters are utilized to determine the spatial relationship between the measurement device and the object, as noted above. Therefore, the transmitters/receivers of Ritter and Rhoads are **functionally equivalent** to the claimed transmitter/receivers. Furthermore, the spatial configuration of the transmitter/receiver can be interchanged without affecting the resultant calculations (spatial relationship between the camera and the object). For example, the spatial relationship determined between a receiver that is located at point A and a transmitter that is located at point B would be equivalent to the spatial relationship determined between a transmitter that is located at point A and a receiver that is located at point B. As a result, the Examiner notes that it would have been obvious to modify the transmitters/receivers of Ritter and Rhoads so that the receivers are provided at the object side and the measurement device side while the transmitter is provided away from the object as well as the measurement device, since no new or unexpected results are seen to be attained by having this configuration.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ck
August 13, 2004

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